

CLAIMS

1. A method for measuring auditory evoked potentials of an auditory system of a patient or animal body, said comprising:

surgically implanting at least two pickup electrodes in the temporo-occipital area inside said body,

picking up electrical signals resulting from neuronal activity of said auditory system by means of said at least two pickup electrodes, and

producing signals representative of neuronal activity of said auditory system from said electrical signals sensed by said pickup electrodes.

2. The method according to claim 1 wherein said at least two extracochlear pickup electrodes are surgically implanted in the temporo-occipital area of said body, so that a line linking said pickup electrodes is substantially parallel to the cerebral trunk of said body.

3. The method according to claim 1 wherein said electrical signals have an amplitude between 0.1 μ V and 10 μ V.

4. The method according to claim 1 further comprising stimulating said auditory system by stimulation means implanted in said auditory system, thereby generating said neuronal activity of said auditory system.

5. The method according to claim 4 wherein said stimulation means are implanted in the cochlea of said auditory system.

6. The method according to claim 4 wherein said stimulation means are implanted outside of the cochlea of said auditory system.

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7. The method according to claim 1 further comprising acoustically stimulating said auditory system by stimulation means implanted in said auditory system, thereby generating said neuronal activity of said auditory system.

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8. The method according to claim 1 further comprising mechanically stimulating said auditory system by a vibrator implanted in said auditory system, thereby generating said neuronal activity of said auditory system.

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9. The method according to claim 1 further comprising electrically stimulating said auditory system by at least one stimulation electrode implanted in said auditory system, thereby generating said neuronal activity of said auditory system.

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10. The method according to claim 9 wherein said at least one stimulation electrode forms a stimulation dipole which is surgically implanted so as to be substantially perpendicular to a line linking said at least two pickup electrodes.

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11. The method as in claim 10 further comprising positioning said stimulation dipole with respect to said at least two pickup electrodes so as to reduce stimulation artifact in said electrical signals resulting from neuronal activity of said auditory system.

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12. The method according to claim 1 further comprising:

surgically implanting a plurality of electrodes in the temporo-occipital area in said body, and

selecting said at least two pickup electrodes and at least one stimulation electrode from said plurality of electrodes, based on quality of signals detected by said pickup electrodes.

13. The method according to claim 12 further comprising selecting a pickup reference electrode and a stimulation reference electrode from said plurality of electrodes.

14. The method according to claim 1 further comprising stimulating at least a portion of said auditory system by means of at least one surgically implanted vibrator.

15. The method as in claim 1 further comprising amplifying said electrical signals resulting from neuronal activity of said auditory system, and transmitting the amplified electrical signals through the skin of said body, and producing said signals representative of neuronal activity of said auditory system from said transmitted electrical signals.

16. An implantable device for measuring auditory evoked potentials of an auditory system, said device comprising:

at least two extracochlear pickup electrodes implantable in a patient or animal body for sensing electrical signals resulting from neuronal activity of the auditory system of said body, said sensed electrical signals having an amplitude on the order of 1 μ V to 10 μ V, and

an amplifier module having input terminals connected respectively to said extracochlear pickup electrodes, said amplifier module producing signals

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representative of neuronal activity of said auditory system from said electrical signals sensed by the extracochlear pickup electrodes.

5 17. The device according to claim 16 wherein said at least two extracochlear pickup electrodes are spaced apart by more than 3 cm.

10 18. The device according to claim 16 further comprising a sealed package containing said amplifier module, said extracochlear pickup electrodes being placed on either side of said sealed package in substantially diametrically opposite positions, and are mounted at the ends of a flexible support enabling them to be positioned
15 optimally.

20 19. The device according to claim 16 comprising at least three extracochlear pickup electrodes implantable in a patient or animal body outside of the cochlea of said auditory system for sensing electrical signals resulting from neuronal activity of the auditory system of said body, a sealed package containing said
25 amplifier module and a multiplexer, said at least three extracochlear pickup electrodes being connected to the amplifier module via said multiplexer and being placed so as to be distributed around the package on a flexible support.

30 20. The device according to claim 16 further comprising a sealed package containing said amplifier module, a pickup reference electrode, and means for moving said pickup reference electrode relative to said sealed package.

35 21. The device according to claim wherein said pickup reference electrode is fixed on said package.

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22. The device according to claim 16 further comprising stimulation means for stimulating said auditory system, thereby generating said neuronal activity of said auditory system.

23. The device according to claim 22, wherein said stimulation means comprise at least one stimulation electrode for electrically stimulating at least a portion of said auditory system.

24. The device according to claim 23 wherein said at least one stimulation electrode forms a stimulation dipole which is disposed substantially perpendicularly to a line linking two of said pickup electrodes.

25. The device according to claim 24 further comprising means for positioning said at least two extracochlear pickup electrodes with respect to said stimulation dipole so as to reduce stimulation artifacts.

26. The device according to claim 22, wherein said stimulation means comprise acoustic stimulation means for stimulating at least a portion of said auditory system.

27. The device according to claim 22, wherein said stimulation means comprise at least one vibrator for mechanically stimulating at least a portion of said auditory system.

28. The device according to claim 16 wherein said amplifier module comprises a differential amplifier connected to said two extracochlear pickup electrodes and having a ground terminal connected to a reference pickup electrode implantable of the mastoid of said body.

29. The device according to claim 16 further comprising a reference pickup electrode implantable on the mastoid of said body, said amplifier module having one ground terminal connected to said reference pickup electrode.

30. The device according to claim 16 wherein said amplifier module comprises means for amplifying signals having an amplitude 100 to 1000 times smaller than the amplitude of signals detected with electrodes placed in the cochlea of said auditory system, for producing signals representative of neuronal activity of said auditory system from said electrical signals sensed by the extracochlear pickup electrodes.

31. The device according to claim 16 further comprising a signal processor for processing said signals representative of said neuronal activity.

32. The device according to claim 16 further comprising a sealed package containing said amplifier module and a transmitter for transmitting radio signals through the skin of said body.

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